

Appendix A: Four Corners Statements

- 1) I like to be the organizer of activities with my friends to make sure we all get to go places together.
- 2) I like to be the messenger of essential information and knowledge.
- 3) I like to be the caregiver when a friend or family member needs my help.
- 4) I like to be the person who diffuses conflict and makes sure my friends all stick together.

Appendix B: Blood Components Worksheet

SBI3U

Name:

Date:

Blood Components Worksheet

A. PLATELETS

1) Draw a sketch of a platelet and write some words beside to describe its features.



2) The scientific name for a platelet is a _____. They make up around _____ % of total blood volume. They are very small in size, only _____ in diameter.

3) Platelets are not cells, but instead are considered _____ since they do not have a _____ and therefore do not carry DNA. Platelets have actually broken off from cells in _____. These origin cells are also scientifically called _____.

4) A platelet's life span is _____ days. The function of platelets in the blood are to form _____. This process is also called _____. These clots can be formed externally, when the blood is exposed to _____ and we typically call this a _____. They can also be formed internally, in the form of a _____ just underneath the surface of the skin.

5) If the number of platelets in the blood is too low, then a person may experience _____. If the number of platelets in the blood is too high, the following can happen:

- a.
- b.
- c.

WORD BANK

blood clots

bruise

5

megakaryocytes

stroke

nucleus

excessive bleeding

5 – 9

pulmonary embolism

coagulation

scab

cell fragments

bone marrow

Thrombocyte

2-3 micrometers

air

myocardial infarction

1

cell wall

10

B. PLASMA

1) Give a brief description of what blood plasma looks like.

2) Plasma makes up around _____% of total blood volume. It's density is approximately _____.

3) Plasma itself is made up mostly of _____, with a proportion of _____% by volume. The remaining _____% of blood plasma is made up of various dissolved salts and minerals such as _____, _____, _____ and _____.

4) The main function of plasma is for _____. It is responsible for moving _____, _____, _____, _____ and _____ to the necessary parts of the body.

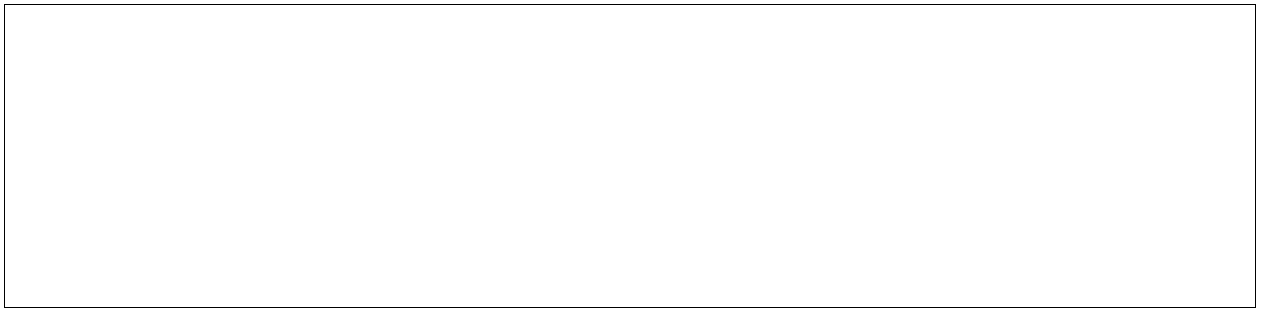
5) Scientists can isolate blood plasma by using a _____, which is a piece of laboratory equipment that uses _____ acceleration to separate parts of a solution according to their _____.

WORD BANK

1025 kg/m ³	10	potassium	hormones	calcium
water	minerals	transportation	90	clotting factors
magnesium	densities	proteins	waste products	75
centripetal	sodium	55	centrifuge	dilution

C. RED BLOOD CELLS

1) Sketch a rough diagram of a red blood cell from the aerial and side view. Use labels and scale if possible.



2)

2) Red blood cells (RBCs), also known as _____ are the most common type of blood cell in vertebrate blood. The main function of RBCs within human body is to _____.

3) Vertebrate blood appears _____ in colour. The main component of RBCs that makes it this colour is _____.

4) What is hemoglobin and its function in RBCs? (short answer – not in Word Bank) _____.

5) Each RBC contains approximately _____ hemoglobin molecules and makes up _____% of RBC content. Single hemoglobin molecule can carry up to _____ O_2 molecules. As blood passes through the body's tissues, hemoglobin _____ the O_2 molecules to nearby cells.

6) Human mature RBCs look like flexible _____ and lack a _____. Because RBCs lack nuclei and organelles, RBCs do not contain _____ making them incapable of _____.

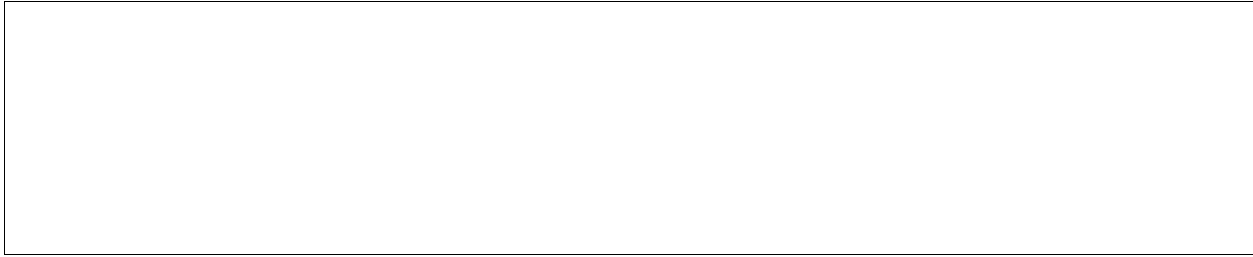
7) On average, human RBCs take approximately _____ seconds to complete one full cycle of circulation. The average life cycle of a RBC is _____.

WORD BANK

97	270 million	120 days	DNA
deliver oxygen to body tissues	white	biconcave disks	20
releases	4	nucleus	50
cell division and repairing	hemoglobin	Erythrocytes	red

D. WHITE BLOOD CELLS

1) Sketch a rough diagram of a white blood cell. Use labels and scale if possible.



2) White blood cells (WBCs), also known as _____ make up approximately ____% of healthy, human blood content.

3) White blood cells are found in the human circulatory system and the _____ system, the latter providing the body with _____.

4) The number of WBCs in the blood is an indicator of _____. WBCs are constantly on the lookout for signs of disease and _____ and when they detect threats, WBCs spring to action and attack. If an invading infection fights back and persists, the # of WBCs will _____.

5) Leukocytes appear _____ in colour. This is because after centrifugation, WBCs are separated into the _____ coat of the blood content, which appears as a thin, white layer that rests between the _____ and _____.

6) Unlike red blood cells (RBC), a white blood cell contains a _____. WBCs have a short life cycle, living for about _____ days in the average, healthy human body.

7) There are several types of WBCs, each with distinct form and functions. A major feature of leukocytes is the presence of _____.

WORD BANK

3 to 4
1
lymphatic

nucleus
increase
granules

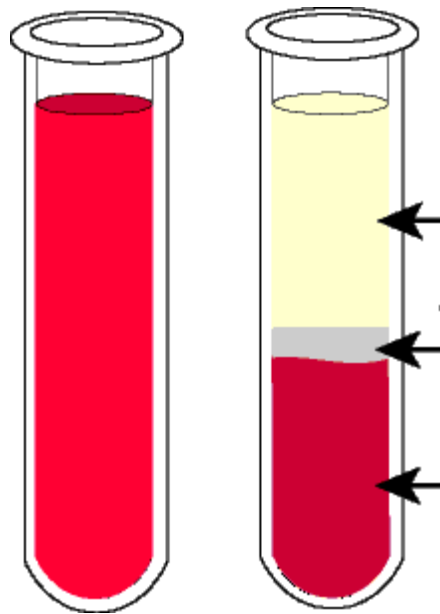
foreign materials
disease
white

buffy
Leukocytes
immunity

red blood cells
blood plasma
decrease

5
cell membrane

Blood Component Breakdown



Sources

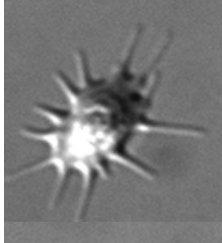
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- 2) How Stuff Works. *How Blood Works*. Retrieved October 20th, 2011, from: <http://science.howstuffworks.com/environmental/life/human-biology/blood2.htm>
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- 4) Tortora, G.J & Derrickson, B. (2006). Principles of Anatomy and Physiology. Hoboken, NJ: *John Wiley & Sons Inc.*
- 5) Wisc-Online. *White Blood Cells*. Retrieved October 20th, 2011, from: <http://www.wisc-online.com/objects/ViewObject.aspx?ID=ap14604>
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Appendix C: Solutions to Blood Components Worksheet

Blood Components Worksheet (**SOLUTIONS**)

A. PLATELETS

1) Draw a sketch of a platelet and write some words beside to describe its features:



- irregularly shaped
- thorned, spiky oval
- colorless

2) The scientific name for a platelet is a **thrombocyte**. Platelets make up around **1%** of total blood volume. They are very small in size, only **2-3 micrometers** in diameter.

3) Platelets are not cells, but instead are considered **cell fragments** since they do not have a **nucleus** and therefore do not carry DNA. Platelets have actually broken off from cells in **bone marrow**. These origin cells are also scientifically called **megakaryocytes**.

4) A platelet's life span is **5 – 9** days. The function of platelets in the blood are to form **blood clots**. This process is also called **coagulation**. These clots can be formed externally, when the blood is exposed to **air** and we typically call this a **scab**. They can also be formed internally, in the form of a **bruise** just underneath the surface of the skin.

5) If the number of platelets in the blood is too low, then a person may experience **excessive bleeding**.

If the number of platelets in the blood is too high, the following can happen:

- **stroke**
- **myocardial infarction**
- **pulmonary embolism**

B. PLASMA

1) Give a brief description of what blood plasma looks like.

- liquid
- transparent
- straw coloured, yellow
- can be cloudy or grayish depending on the individual's health

2) Plasma makes up around 55% of total blood volume. It's density is approximately 1025 kg/m^3 .

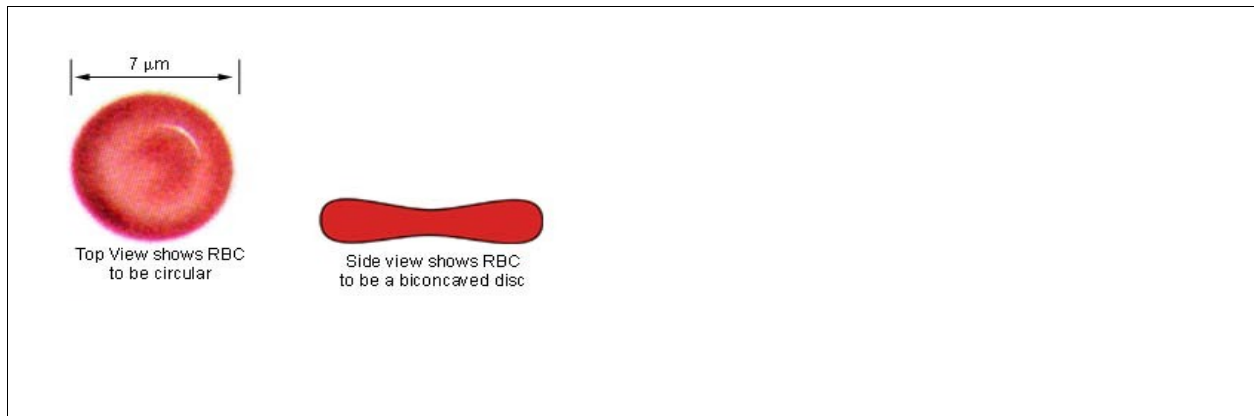
3) Plasma itself is made up mostly of water, with a proportion of 90% by volume. The remaining 10% of blood plasma is made up of various dissolved salts and minerals such as calcium, sodium, potassium and magnesium.

4) The main function of plasma is for transportation. It is responsible for moving proteins, minerals, clotting factors, hormones and waste products to the necessary parts of the body.

5) Scientists can isolate blood plasma by using a centrifuge, which is a piece of laboratory equipment that uses centripetal acceleration to separate parts of a solution according to their densities.

C. RED BLOOD CELLS

1) Sketch a rough diagram of a red blood cell from the aerial and side view. Use labels and scale if possible.



2)

Red blood cells (RBCs), also known as **erythrocytes** are the most common type of blood cell in vertebrate blood. The main function of RBCs within human body is to **deliver oxygen to body tissues**.

3) Vertebrate blood appears **red** in colour. The main component of RBCs that make it this colour is **hemoglobin**.

4) What is hemoglobin and its function in RBCs? **A protein chemical, or metalloprotein, that contains the element of Iron. Hemoglobin is the carrier oxygen and facilitates transport in the RBCs.**

5) Each RBC contains approximately **270 million** hemoglobin molecules and makes up **97%** of RBC content. Single hemoglobin molecule can carry up to **4** O₂ molecules. As blood passes through the body's tissues, hemoglobin **releases** the O₂ molecules to nearby cells.

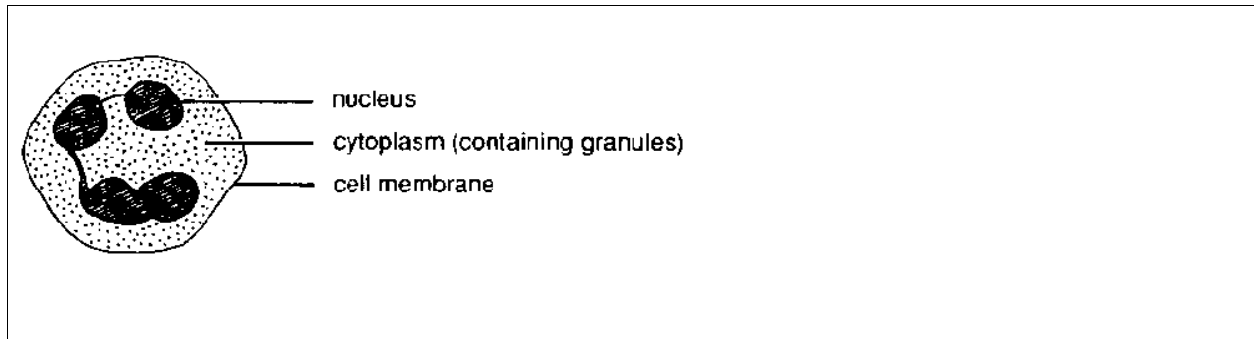
6) Human mature RBCs are flexible and look like **biconcave disks** and lack a **nucleus**.

Because RBCs lack nuclei and organelles, RBCs do not contain **DNA** making them incapable of **cell division and repairing**.

7) On average, human RBCs take approximately **20** seconds to complete one full cycle of circulation. The average life cycle of a RBC is **120 days**.

D. WHITE BLOOD CELLS

1) Sketch a rough diagram of a white blood cell. Use labels and scale if possible.



2)

2) White blood cells (WBCs), also known as **leukocytes** make up approximately **1%** of healthy, human blood content.

3) White blood cells are found in the human circulatory system and the **lymphatic** system, the latter providing the body with **immunity**.

4) The number of WBCs in the blood is an indicator of **disease**. WBCs are constantly on the lookout for signs of disease and **foreign materials** and when they detect threats, WBCs spring to action and attack. If an invading infection fights back and persists, the number of WBCs will **increase**.

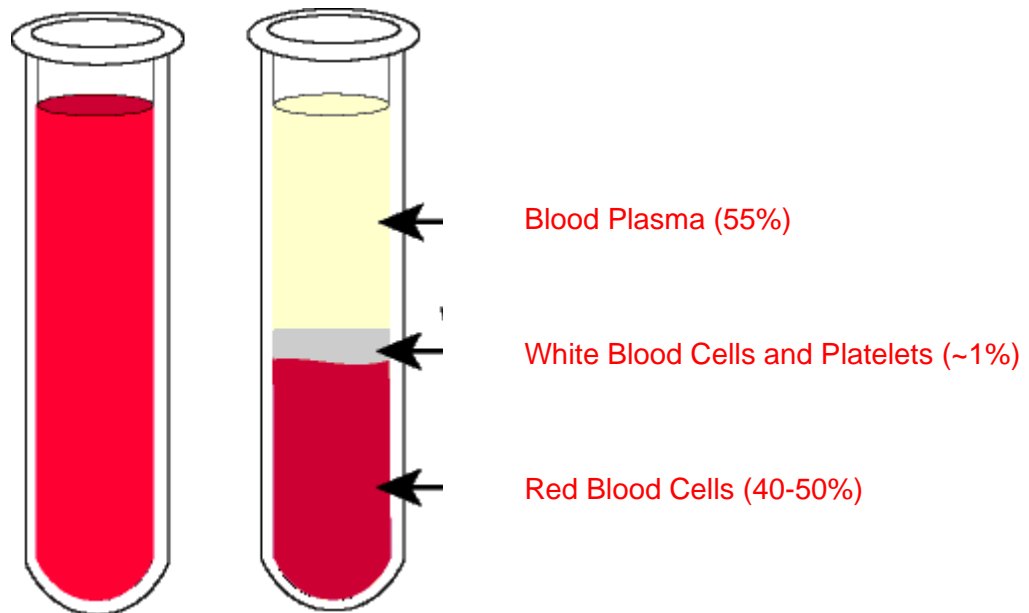
5) Leukocytes appear **white** in colour. This is because after centrifugation, WBCs are separated into the **buffy** coat of the blood content, which appears as a thin, white layer that rests between the **red blood cells** and **blood plasma**.

6) Unlike red blood cells (RBC), a white blood cell contains a **nucleus**.

WBCs have a short life cycle, living for about **3 to 4** days in the average, healthy human body.

7) There are several types of WBCs, each with distinct form and functions. A major feature of leukocytes is the presence of **granules**.

Blood Component Breakdown (**SOLUTIONS**)



APPENDIX D: Exit Card

EXIT CARD

Something that really helped me in my learning today was...

Something I still don't understand and/or want clarification on is...

Did you know that...

There are currently a total of 30 recognized human blood group systems? You might be familiar with the commonly known simplified "ABO" system, but grouping human blood types is actually a difficult process and other categorizing systems exist! Do you know your blood type?

Joke of the Day!

Two vampires walked into a bar and called for the bartender.

"I'll have a glass of blood," said one.

"I'll have a glass of plasma," said the other.

"Okay," replied the bartender, "That'll be one blood and one blood lite."